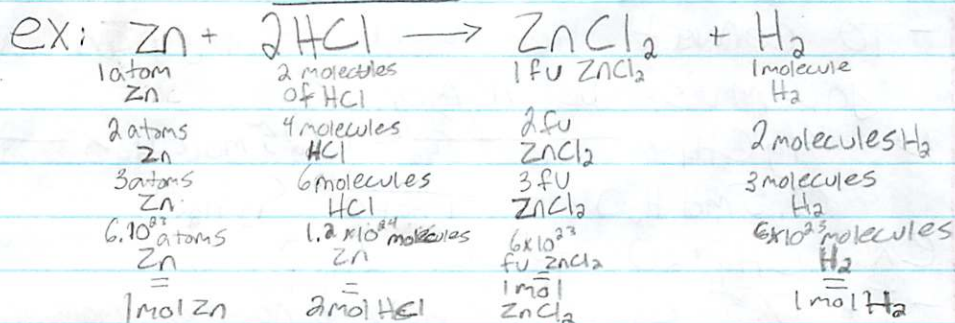


Chapter 17

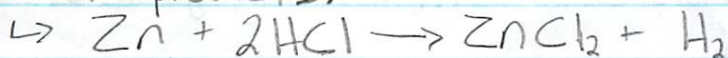
Stoichiometry

↳ Molar Ratios

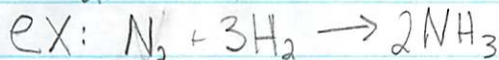
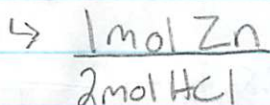
↳ Mol-mol



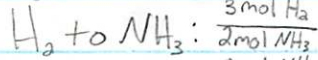
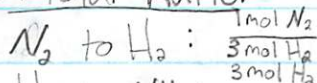
★ ↳ Coefficients are the number of mols of reactants of products.



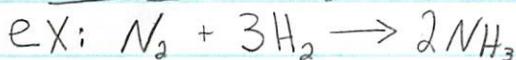
- Zinc to HCl ratio (mols)



↳ Molar Ratio:

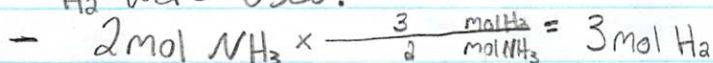


↳ Inverse: $\frac{2 \text{ mol NH}_3}{3 \text{ mol H}_2}$

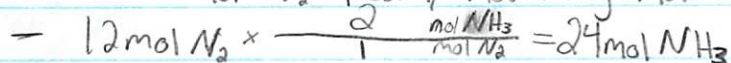


↳ Molar Ratio of H_2 to NH_3 : $\frac{3 \text{ mol H}_2}{2 \text{ mol NH}_3}$

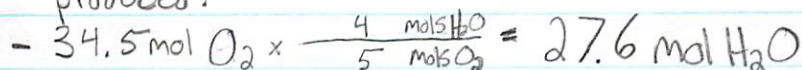
↳ If 2.0 mol of NH_3 are produced, how many mols of H_2 were used?



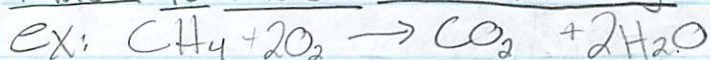
↳ If 12 mol N_2 react, how many moles of NH_3 are produced?



↳ If 34.5 mols of O_2 react, how many mols of H_2O are produced?



Mass to Mass Stoichiometry



↳ If 4g CH_4 react, what mass of water is produced?

* - TO convert between 2 things in a reaction, you must be in mols.

$$\begin{aligned} \text{↳ } 4\text{g CH}_4 &\times \frac{1 \text{ mol CH}_4}{16 \text{ g CH}_4} = 0.25 \text{ mol CH}_4 \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol CH}_4} = 0.5 \text{ mol} \\ 0.5 \text{ mol H}_2\text{O} &\times \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 9\text{g H}_2\text{O} \end{aligned}$$



1. - If 17.5g of CO_2 are produced, how many mols of O_2 Combusted?
2. - If 18.4mols CH_4 burn, how many grams of H_2O were produced?

$$\textcircled{1} 17.5\text{g CO}_2 \times \frac{1 \text{ mol CO}_2}{44 \text{ g CO}_2} = 0.39 \text{ mol CO}_2 \times \frac{2 \text{ mol O}_2}{1 \text{ mol CO}_2} = 0.78 \text{ mol O}_2$$

$$\textcircled{2} 18.4 \text{ mols CH}_4 \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol CH}_4} = 36.8 \text{ mol H}_2\text{O} \times \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 662.4 \text{ g H}_2\text{O}$$

Theoretical Yield: Calculated yield based on stoich.

Actual Yield: experimental yield → amount of product from the experiment.

% Yield: $\frac{\text{actual yield}}{\text{Theoretical Yield}} \times 100\%$